

The Kinetics of Phase Transitions in Diblock-copolymer Melts

F.J.M. Schipper, G. Floudas, (FORTH –Hellas, Greece) and F. Yeh (SUNY, Stony Brook)

Abstract No. schi7655

Beamline(s) **X27C**

We studied the kinetics of the crystallization and order-to-order phase transitions in a low molecular weight diblock-copolymer melt ($M_w \sim 1 \times 10^4$), comprising a part (PEO), that could be crystallized and an amorphous part (PI). Experiments were done on a dual small and wide-angle x-ray (SAXS/WAXS-) facility (at BNL, beam line X27C), on which the scattered intensity of the crystalline and amorphous parts of the diblock material could be obtained simultaneously. Use was made of a T-jump cell set-up allowing for temperature jumps between the various ordered phases of our material. Transitions between varieties of microphases were studied. It was found, that the ordering and crystallization kinetics were not only dependent on the final temperature, but were also a function of the initial phase state of the material. From the experiments in which the final state was the crystalline lamellar phase, however, it appeared, that the final degree of crystallinity was a function of neither the initial state nor the of the quench depth, but rather was the same in all experiments.